



June 12, 2015

Lancaster County Planning Dept & Planning Commission
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Re: Position Regarding Wind Energy Regulations, Proposed Wind Energy Regulations, and Examples of Commercial Wind Energy Setbacks in Nebraska

Dear Planning Commission Member,

Attached are documents regarding the currently proposed commercial wind energy regulation text amendments. These documents include:

1. Position Regarding Wind Energy Regulations which states the potential economic benefits of Wind Energy Development, requests the adoption of sound level limits which align with the City of Lincoln's own noise ordinance for agricultural land use zones, a provides links both a current, comprehensive literature review of wind turbine sound and health studies and a link to a comprehensive wind turbine health impact study by expert independent panel members performed for the Massachusetts Department of Environmental Protection and Department of Health.
2. County Zoning Resolution Article 13 Proposed Amendment to Special Permit 13.018
3. Table of Commercial Wind Energy Setback Rules in Nebraska

Specifically, the sound level limits currently proposed in the draft of the wind energy text amendment could prohibit wind energy development in Lancaster County.

For more information please visit www.hallamwind.wordpress.com

Sincerely,

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Position regarding Wind Energy Regulations

Wind power is a reliable, clean, renewable resource that will contribute to healthy communities in Lancaster County by contributing to the tax base, providing jobs and other economic benefits.

Economic Benefits

- Baird Holm and Bluestem Energy's report entitled "Impact of Wind Energy on Property Taxes in Nebraska" estimates **\$6,600 per MW of facility capacity per year contribution to a county's property tax revenue** as a result of installed wind energy. Thus, a 200MW facility generates \$1,325,200 in annual property tax.¹
- Additional local benefits include:
 - o Substantial contribution to Lancaster County's tax base;
 - o County road maintenance and improvements;
 - o Landowner income and multiplier effects of additional income in local community;
 - o Contracting for goods and services associated with construction of a \$100m+ project;
 - o Producing power with no fuel, no water use, and no emissions; and
 - o Compatibility with current agricultural use land (crops, grazing, recreation, etc.)

Health and Safety

There are many community stakeholders who would like to see wind farms developed safely and responsibly in Lancaster County. To assure that future potential projects in rural parts of Lancaster County are not prohibited, the County should pass reasonable regulations for the agricultural zone of Lancaster County.

We request that the Planning Commission and Board of Supervisors adopt noise regulations for wind energy which align with the City of Lincoln's own Noise Control Ordinance Chapter 8.24². Decibel dB(A) limits are provided for daytime / nighttime periods for various land-use categories, including agricultural. A penalty schedule is set forth in connection with violation of dB(A) limits at various levels. The sound level limits (in dBA maximum ten-minute Leq) as measured at the receptor for agricultural land-use zones are:

- 6am to 10pm – 75 dBA
- 10pm to 6am – 50 dBA

Noise limits for county agricultural zones should be consistent with the City limit agricultural zones. As a concession to non-participating residents we would consider nighttime limits of 45 dBA; however, subject to testing and confirmation by a certified sound engineer with penalty and violation structure similar to Lincoln's current Noise Control Ordinance in the event a limit was believed to have been exceeded.

¹ http://www.bairdholm.com/images/Property_Tax_Relief_through_Wind_Energy_in_Nebraska.rev.pdf

² <https://lincoln.ne.gov/city/attorn/lmc/ti08/ch824.pdf>

Scientific Studies / Sound and Health

No health impacts from wind turbine noise, says MIT study

<http://www.elp.com/articles/2014/12/mit-finds-no-human-health-risk-from-wind-turbines.html>

The major findings and conclusions of this literature review are consistent with the findings of most of the more robust epidemiological studies in the area of wind and health, including the recently released Health Canada summary. The MIT review includes the following summary of the authors' conclusions:

1. Measurements of low-frequency sound, infrasound, tonal sound emission, and amplitude-modulated sound show that infrasound is emitted by wind turbines. The levels of infrasound at customary distances to homes are typically well below audibility thresholds.
2. No cohort or case-control studies were located in this updated review of the peer-reviewed literature. Nevertheless, among the cross-sectional studies of better quality, no clear or consistent association is seen between wind turbine noise and any reported disease or other indicator of harm to human health.
3. Components of wind turbine sound, including infrasound and low frequency sound, have not been shown to present unique health risks to people living near wind turbines.
4. Annoyance associated with living near wind turbines is a complex phenomenon related to personal factors. Noise from turbines plays a minor role in comparison with other factors in leading people to report annoyance in the context of wind turbines.

Link to MIT Literature Review –

http://journals.lww.com/joem/Abstract/2014/11000/Wind_Turbines_and_Health_A_Critical_Review_of_the.9.aspx

Independent studies conducted around the world, including the U.S., have consistently found that wind farms have no direct impact on physical health.

- The Massachusetts Departments of Environmental Protection and Public Health recently commissioned a panel of experts with backgrounds in public health, epidemiology, toxicology, neurology and sleep medicine, neuroscience, and mechanical engineering to analyze “the biological plausibility or basis for health effects of turbines (noise, vibration, and flicker).” The review of existing studies included both peer-reviewed and non-peer reviewed literature.
- Specifically the Massachusetts study found no evidence for a set of health effects from exposure to wind turbines that could be characterized as “Wind Turbine Syndrome.” Claims that infrasound from turbines directly impacts the vestibular system have not been demonstrated scientifically.

MA Dept of Health Study – <http://www.mass.gov/eea/docs/dep/energy/wind/turbine-impact-study.pdf>

Examples of Commercial Wind Energy Setbacks

April 29, 2015

Selected Nebraska Counties from Nebraska Wind Energy and Wildlife Project for Commercial Wind Energy Systems

| COUNTY | NOISE LIMIT AT OCCUPIED RESIDENCE(dBA) | SETBACK FROM OCCUPIED RESIDENCE | SETBACK FROM NON PARTICIPATING PROPERTY LINES | SETBACK FROM ROAD RIGHT OF WAY | County Reg. Page # |
|-----------|--|--|---|---|-----------------------|
| Adams | 50 | 1,000 | 150 feet (or less w/ adjoining participating property owners) | 1X total tower height | 127 |
| Antelope | 50 | 1,000 | 1.1 x rotor blade length | 1.1 x rotor blade length | 76 |
| Cass | Documented attempt at minimization | Not specific; at least 2 x total height | 2 x total height | 2 x total height | 127 |
| Cedar | 50 | None listed; at least 1 x total height | 1 x total height | 1 x total height | 52 |
| Clay | 50 | 1,000 | 150 (or less w/ adjoining participating property owners) | 1/2 rotor diameter | 76 |
| Fillmore | 50 | 1,000 | 150 (or less w/ adjoining participating property owners) | 1 x total height | 89 |
| Frontier | 50 * | 1,000 | Rotor Diameter plus applicable building setback | Blades shall not encroach on ROW | 66 |
| Gage | 60 * | 1,320 | 1.5 x total height | 1.1 x total height | 6 |
| Hayes | 50 | see property line setback | 1/2 blade diameter or 150 feet (whichever is greater) | 1/2 blade diameter or 150 feet (whichever is greater) | 58 |
| Hitchcock | 50 | 1,000 | 1/2 blade diameter | 1/2 blade diameter | 62 |
| Holt | 60 | 2,640 | 1/2 blade diameter | 1/2 blade diameter | 13 |
| Howard | 50 * | 1,000 | Rotor diameter plus applicable building setback | Blades shall not encroach on ROW | 222 |
| Kearney | 50 | 1,000 | 150 feet (or less w/ adjoining participating property owners) | 1 x total height | 49 |
| Keith | 50 | None listed; at least 1/2 blade diameter or 150' | 1/2 blade diameter or 150 feet (whichever is greater) | 1/2 blade diameter or 150 feet (whichever is greater) | Article 20 section 14 |
| Kimball | 50 | 1,000 | 1.1 x total height | 1.1 x total height | 46 |

| COUNTY | NOISE LIMIT AT OCCUPIED RESIDENCE(dBA) | SETBACK FROM OCCUPIED RESIDENCE | SETBACK FROM NON PARTICIPATING PROPERTY LINES | SETBACK FROM ROAD RIGHT OF WAY | County Reg. Page # |
|-----------|--|--|--|----------------------------------|--------------------|
| Knox | 50 * | 1,500 | Rotor diameter plus applicable building setback | Blades shall not encroach on ROW | 99 |
| Lancaster | 35 at property line within mile | 1,000 feet to property line | 1 x total height | 1 x total height | Article 13 p. 17 |
| Lincoln | 50 | 2,000 | Rotor diameter plus applicable building setback | 1 x total height | 108 |
| Madison | 50 * | 1,000 | Rotor diameter plus applicable building setback | Blades shall not encroach on ROW | Section 603 p. 2 |
| Perkins | 50 | 2,000 | 150 feet | 1/2 blade diameter | 55 |
| Polk | 60 | 1 x total height | Rotor diameter plus applicable building setback | 1 x total height | 47 |
| Seward | 50 | 1,000 | 150 (or less w/ adjoining participating property owners) | 1 x total height | 99 |
| Webster | 55 | 2 x total height or minimum 1,000 feet | 2 x blade length for S, E, and W property lines; 1.1 x total height for north property lines | 2 x blade length | 54 |
| York | 50 | 1,000 | 1/2 rotor diameter | 1/2 rotor diameter | 100 |

Notes: 1) Source for links to zoning regulations from <http://snr.unl.edu/renewableenergy/wind/windenergydevelopment.asp#zoning>. Table displays many types of county regulations, but is not intended to be all inclusive of all jurisdictions in Nebraska. 2) * = In the event of periods of severe weather, as defined by the United States Weather Service, a CWECs may exceed dBA level." 3) Most setbacks to occupied dwelling units were reciprocal in that no dwelling unit shall be constructed within the same distance of CWECs. 4) WECS Setback Examples:

| Total Tower Height | Rotor Diameter | Resulting setback based on: | | | |
|--------------------|----------------|-----------------------------|------------------|------------------|--------------------|
| | | 1 x total height | 2 x total height | ½ blade diameter | Diameter + Setback |
| 325 | 235 | 325 | 650 | 117.5 | 285 |
| 400 | 300 | 400 | 800 | 150.0 | 350 |
| 465 | 355 | 465 | 930 | 177.5 | 405 |

Table is generalized for comparison purposes only. Assumes a 50 foot building setback for comparison purposes.

Proposed Wind Energy Regulations

Subsequent to the thorough discussion of wind energy topics conducted by the Lancaster County Planning Department in its Wind Energy Text Amendment Working Group¹ from March to May 2015, in order to balance Economic and Environmental Opportunity with Safety and Health Requirements, we propose the following Amendment to County Zoning Article 13.

County Zoning Resolution Article 13 Proposed Amendment to Special Permit 13.018

A Commercial Wind Energy Conversion System (CWECS) may be allowed in the AG District by Special Permit under the conditions listed below:

- (a) For purposes of this Section 13, a “participating” property is under a contractual agreement with the CWECS owner. Each CWECS machine shall be located no closer than:
 - i. 1,000 feet or 2.0 times total structure height, whichever is greater, from the closest exterior wall of a residence on a non-participating property;
 - ii. 1,000 feet or 2.0 times total structure height, whichever is greater, from the property line for a non-participating lot of less than 10 acres;
 - iii. 1,000 feet from the closest exterior wall of any participating residence.
 - iv. Machine hub height plus 0.5 times its rotor diameter to public paved roads;
 - v. 1.0 times machine rotor diameter to public unpaved roads;
 - vi. 1.0 times total structure height from the boundary of a property not participating in the Special Permit.

- (b) The distance from all external boundary lot lines and/or right-of-way lines of the Special Permit to any tower support base of the CWECS shall be equal to 1.0 times total structure height; provided, however, that in order to enable siting of CWECS which do not interfere with pivot irrigation systems, the Special Permit applicant may, at the time of applying, submit written waiver requests, signed by the relevant adjacent landowner(s), to allow a setback of rotor radius plus the setback of the district.

- (c) No CWECS shall operate in such a manner that the sound level (in dBA maximum ten-minute Leq at the receptor) emitted by the CWECS exceeds the levels set forth below. All readings shall be taken at the closest exterior wall of any dwelling (residence) located on the property.
 - i. For participating properties a fifty-five (55) dBA maximum 10 minute Leq during any one hour;
 - ii. For non-participating properties, the greater of:
 1. Forty-five (45) dBA maximum 10 minute Leq; or
 2. Five (5) dBA maximum 10 minute Leq above background level sound, such background level sound as determined by a pre-construction noise

¹ <https://lincoln.ne.gov/city/plan/dev/wind/>

study establishing ambient sound levels over a representative 24 hour period at a representative dwelling.

As a condition of commencing construction under the Special Permit, the CWECS Special Permit grantee shall submit a pre-construction noise study, establishing representative ambient sound levels at representative location(s), to the Lincoln-Lancaster Health Department.

Violation of the sound limits set forth above shall be evaluated by Lincoln-Lancaster County Health Department, and must be further confirmed by an independent specialist Board Certified by the Institute of Noise Control Engineers (INCE).

Upon confirmation of violation(s) by an independent Board Certified INCE specialist, and further affirmation of such conclusion by the County Board, the Special Permit grantee shall be subject to a fine according to the schedule set forth in Table 1.

Table 1. Fine Schedule for CWECS Violations of Sound Level Limits

| Decibels (dBA) in Excess of Limit | Fine per Occurrence |
|-----------------------------------|---------------------|
| 1-4 | \$500 |
| 5-9 | 1,500 |
| 10-14 | 2,000 |
| 15-19 | 2,500 |
| 20+ | 3,000 |

At the County Board's discretion, post-construction noise level measurements may be required; provided, however, that such discretionary measurement may not be required more frequently than twice per calendar year. All CWECS noise complaints shall be referred to the County Board, which shall determine whether noise monitoring is required to determine whether a violation has occurred.

- (d) CWECS construction shall not adversely impact identified by Nebraska Game & Parks Commission or U.S. Fish & Wildlife Service as rare or endangered natural resources, listed species, wetlands, native prairie or grasslands.
- (e) No CWECS shall obstruct or impair an identified view corridor.
- (f) CWECS shall be designed and placed in such a manner as to minimize to the greatest extent feasible, adverse visual impacts on areas adjacent to the Special Permit property. The Special Permit grantee shall document projections of the "shadow flicker" on any residences located outside of the Special Permit property which are occupied for at least 6 months per calendar year.

- (g) As a condition of commencing construction, the CWECS Special Permit grantee shall enter into an agreement with the County Engineer regarding use of County roads during construction.
- (h) CWECS machines shall comply with all Federal Aviation Administration (FAA) requirements and shall have only the lighting as required by the FAA or other Federal agency.
- (i) CWECS shall be finished in a white, gray or another unobtrusive color with a non-reflective finish. There shall be no advertising, logo or other symbols painted on the CWECS other than those required by the FAA or other governing body. Each CWECS shall have a nameplate which is clearly legible and contains contact information of the operator of the wind facility.
- (j) Each CWECS shall have a decommissioning plan outlining the means, procedures and cost of removing the machine(s) and all related supporting infrastructure and a letter of credit, bond, or equivalent enforceable resource to guarantee removal and restoration upon discontinuance, decommissioning or abandonment.
- (k) CWECS must meet all applicable Federal, State and local rules and regulations.

In the case of CWECS which are part of a unified plan for a wind farm, parcels which are separated from one another only by the presence of a public right-of-way may be combined into one Special Permit application. When a CWECS special permit covers multiple premises, the lease or easement holder may sign the application rather than the lot owner